talk

HIGHER DIMENSIONAL REPRESENTATIONS OF SL_2 AND ITS REAL FORMS VIA PLÜCKER EMBEDDING

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In the present paper we study the inclusion of the complex Lie algebra $\mathfrak{sl}_2 \cong \mathfrak{so}_3 \subset \mathfrak{so}_n$ realized as a Plücker embedding, and thus, attempt to construct higher dimensional representations of the real forms of SO_3 in terms of $\mathsf{SO}(n)$ and $\mathsf{SO}(p,q)$ transformations, beyond the standard block-matrix realization. Moreover, we consider Euler and Wigner type decompositions in this setting and show how the Plücker relations appear in a natural way. Explicit examples are provided for $n = 3$, 4 and 5 in the context of special relativity, classical and quantum mechanics.

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